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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/046,797
Filing Date: January 14, 2002
Appellant(s): LUO, HUITAO

James D. Shaurette

For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 6/2/2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

Claims 6 and 15 are now objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

This appeal now involves claims 1-5, 7-14, and 16-36.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,774,595	Kim	6-1998
5,974,175	Suzuki	10-1999
4,843,630	Catros et al.	6-1989
6,332,034	Makram-Ebeid et al.	12-2001
6,055,337	Kim	4-2000
5,471,535	Ikezawa	11-1995

Huitao Luo and Alexandro Eleftheriadis, "Desiging an Interactive Tool for Video Object Segmentation and Annotation," Advent Group, Columbia University, July 12, 1999.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-5, 7-14, and 16-36 are rejected under 35 U.S.C. 103(a). This rejection is set forth in a prior Office Action, mailed on 12/27/2004.

(10) Response to Argument

A. As to the argument that the rejection of claims 1-19, 25-30, and 33-36 over Kim ('595) and Suzuki is improper because there is no motivation to combine the references:

Appellant argues that Kim and Suzuki are directed to different solutions for different problems. Appellant further argues that the Kim reference is a video signal encoder capable of reducing approximation errors in encoded contour information, while

Suzuki is directed towards identifying a contour for extraction of an object from an image frame. Appellant further argues that because they are directed to different subjects, the Suzuki reference cannot be used to improve Kim, and in fact would destroy the Kim reference because user input would slow the video encoding of Kim unacceptably.

In response, the examiner notes that both Kim and Suzuki are directed towards correctly fitting contours in a moving picture sequence. In col. 2, lines 7-10, Kim discloses "...determining a number of vertices on the contour image...[and] fitting the contour image with a plurality of line segments to provide a polygonal approximation of the contour image..." Similarly, in col. 2, lines 57-59, Suzuki discloses "...a first contour detection unit which detects contour points which determine a contour of the object of the first image..." Contour detection may be used for different purposes in each invention, but both inventions do include this feature and therefore the combination of Kim and Suzuki is not one of inventions from drastically different arts. It is further noted that both the Kim and Suzuki references are found primarily classified at USPTO in class 382, with both cross-referenced to subclass 266. Thus, the Office has found at least some of the teachings of Kim and Suzuki to be similar.

As to the argument that the teachings of the Suzuki reference would slow the invention of Kim unacceptably, the examiner points out that Suzuki does not require user input in every frame of video. In fact, Suzuki requires only one user input for an object in a frame, and then *automatically* detects contours in subsequent frames. Col. 3, lines 34-37 of Suzuki state "Only the frame and object boundary specification for the

first frame is given by the operator, and the contour detection for all the frames is automatically carried out by the computer operations". Certainly, a user input on a *single frame* would not slow encoding of frames by an amount that would be unacceptable.

Even assuming the appellant is correct that the Suzuki teachings would slow the invention of Kim, prior case law has stated that inefficiency does not preclude a reference or combination of references from being used against an applicant. See *Orthopedic Equip. Co. v. United States, 702 F.2d 1005. 1013. 217 USPQ 193, 199-200 (Fed. Cir. 1983).* While having a user select contours during each frame of video encoding would not be a particularly efficient way to encode a large amount of video, it would be technically possible.

The examiner further notes that prior case law has stated that making a process automatic vs. making a process manual is not a patentable distinction. See *In re Venner, 120 USPQ 192 (CCPA 1958).* Even assuming that the appellant is correct in arguing that Kim and Suzuki cannot be combined, Kim alone would be sufficient to anticipate appellant's invention, because Suzuki only adds a manual interface.

The motivation for a combination of Kim and Suzuki is laid bare in col. 1, lines 10-14 of the Suzuki reference: "extracting a desired object from a sequence of images of a motion picture on the basis of a detected contour of the object while requiring only a simple operation from the operator". Without user input, the encoder of Kim suffers from the deficiency of not being able to select a single object for extraction. The invention of Suzuki corrects this deficiency.

B. As to the argument that the rejection of claims 1-19, 25-30, and 33-36 over Kim ('595) and Suzuki is improper because there is no reasonable expectation of success:

As in arguments covered under heading A, appellant argues that significant user intervention into the encoding process would be required if the teachings of Suzuki were applied to Kim. Appellant further argues that this intervention would destroy the purpose of Kim by slowing processing speeds, citing case law (In re Fitch) that states modification is inappropriate when it renders prior art inoperable for its intended purpose. Examiner notes that Suzuki requires only one user input for an object in a frame, and then *automatically* detects contours in subsequent frames. Col. 3, lines 34-37 of Suzuki state "Only the frame and object boundary specification for the first frame is given by the operator, and the contour detection for all the frames is automatically carried out by the computer operations". Certainly, a user input on a *single frame* would not slow encoding of frames by an amount that would be unacceptable.

Even assuming appellant's argument that the modification to Kim suggested by Suzuki would slow the Kim invention considerably is correct, the Kim invention would still achieve its purpose of video encoding. Prior case law has stated that inefficiency does not preclude a reference or combination of references from being used against an applicant. See *Orthopedic Equip. Co. v. United States, 702 F.2d 1005. 1013. 217 USPQ 193, 199-200 (Fed. Cir. 1983).*

C. As to the argument that the rejection of claims 12-19, 29-30, and 35-36 over Kim ('595) and Suzuki is improper because positively recited limitations of the claims are not disclosed by the prior art even if the references are combined:

Appellant argues that neither Kim nor Suzuki teaches encoding into a "data structure" which is converted. It is the Office's position that "data structure" is a broad term that is not further defined by the claim. A broadly defined "data structure" can encompass any method of storing data, such as in the coded set of quantized transform coefficients in col. 2, lines 19-25 of Kim. These coefficients are data to be transmitted, and therefore have some sort of associated structure inherent. Transmitted data without a structure would be unacceptable because without a structure, data is not organized and cannot be read. Even using a stricter definition, such as that for the computing term "data structure" at the NIST website (http://www.nist.gov/dads/HTML/datastructur.html), which gives the definition of a "data structure" as "An organization of information, usually in memory, for better algorithm efficiency, such as queue, stack, linked list, heap, dictionary, and tree, or conceptual unity, such as the name and address of a person. It may include redundant information, such as length of the list or number of nodes in a subtree", Kim still meets the definition of a "data structure". An "organization of information" is inherent to any data transmitted with intent to be decoded.

Appellant further argues that "converting graphical information of the data structure from a first format to a second format different from the first format" is not well-known in the art. The examiner notes that any number of common graphics programs

such as Microsoft Paint or Adobe Photoshop can perform a format conversion from JPEG to bitmap, or from JPEG to GIF. Similarly, many well-known video editors can convert MPEG2 to MPEG or vice versa. It is nearly impossible to buy a computer that does not have some sort of graphical conversion software on it, as Microsoft Paint comes standard with Microsoft Windows XP. Graphical conversion is extremely well-known in the art, so well-known that even those not skilled in the art are well-versed in its use.

D. As to the argument that the rejection of claims 33-34 over Kim ('595) and Suzuki is improper because positively recited limitations of the claims are not disclosed by the prior art even if the references are combined:

Appellant argues that claim 33 recites a user interface configured to receive user input and processing circuitry and configured to detect contours between respective pairs of vertices responsive to respective user input received via the user interface and that this limitation is not addressed in the grouped rejection of claims 1 and 33. The examiner notes that claims 1 and 33 were rejected with disclosure from Suzuki that determines a contour "when the first image and points adjacent boundary locations of the object of the first image are specified by a user" (col. 2, lines 59-61). A user interface is *inherent* to Suzuki, because Suzuki's invention is on a computer and an interface is the only way for a user to input to a computer. Hence, the "user interface" portion of the limitation of claim 33 can be grouped with the "user input" portion of claim 1. "Processing circuitry to detect contours between respective pairs of vertices responsive to respective user input received via the user interface" is a more specific

apparatus than in claim 1, but because "processing circuitry" is inherent to any computerized device, and said circuitry is performing the same steps as in claim 1, this limitation can also be grouped with the second limitation of claim 1.

E. As to the argument that the rejection of claims 25, 29, and 34 over Kim ('595) and Suzuki is improper because positively recited limitations of the claims are not disclosed by the prior art even if the references are combined:

Appellant argues that Suzuki does not teach a system where user input is different for each contour, because Suzuki uses automatic detection after one contour has been input by a user. The examiner agrees that automatic detection is used but believes that the rejection of claim 25 has been misinterpreted by appellant. In fact, Suzuki teaches a system where one contour is detected based on user input and that *single* contour is then automatically detected in subsequent frames (col. 2, lines 53-65). If one wanted to select a different contour, one would have to restart the invention of Suzuki and select a second contour manually. This restarting of the invention is not disclosed in Suzuki. However, it is inherent to Suzuki that if the invention were restarted, a second contour with *different user input* than the first would be selected.

F. As to the argument that the rejection of claim 28 over Kim ('595), Suzuki, and Ikezawa is improper because there is no motivation to combine the reference teachings:

Appellant argues that there is no motivation to look for references to add to Kim and Suzuki because there is no evidence that Kim or Suzuki suffers from an inability to process "complicated shapes". The examiner notes that Ikezawa provides an

improvement over the Kim and Suzuki references and includes proper motivation that renders an obvious combination, in this case the ability to *better* process complicated shapes by allowing user editing, as stated by col. 11, lines 61-63.

G. As to the argument that the rejection of claim 4 over Kim ('595), Suzuki, and Catros is improper because there is no motivation to combine the reference teachings:

Appellant argues that one concerned with video encoding would not look to teachings about bridging contours and therefore the combination of Catros with Kim and Suzuki lacks proper motivation. The examiner notes that all three references are cross-referenced to class 382, subclass 266 in the USPTO database, so they have been previously judged to include similar material. Further, all of Kim, Catros, and Suzuki are concerned with fitting contours. Figures 2a-2c of Kim show a process for approximating a contour of an object with straight lines. This process is further explained in col. 3, lines 10-30 of Kim. Suzuki also approximates a contour, as explained in col. 5, lines 53-64: "The contour detection unit... operates to detect a contour of the desired object in the image of the specified frame..." Finally, Catros searches for a best-fit contour between two points that do not yet have a contour defined between them. Col. 2, lines 21-29 of Catros state "...the contours thus obtained and stored in digital image memory have discontinuities and it may be desirable to fill these in..."

The Kim reference does involve encoding contours as described in appellant's brief. However, if one were to use Kim's invention on an image missing contours, one would clearly look for a solution to fill in these missing contours. Catros provides this as

motivation for using the invention. As stated in the above paragraph, it may be desirable to fill in discontinuities in an image if such discontinuities exist. Because both references are cross-referenced to the same subclass and both are concerned with finding contours, they are sufficiently similar enough to be combined. Because the Catros reference provides an advantageous feature not included in the Kim reference and clearly states the desirability of this feature in a contour-detection system, sufficient motivation has been provided for a combination between the two references.

H. As to the argument that the rejection of claim 35 over Kim ('595) and Suzuki is improper because there is no motivation to combine the reference teachings:

Appellant argues that Kim is concerned with compression of data and not concerned with extraction of a graphical image, and therefore a combination between Kim and Suzuki is improper and lacks motivation. The examiner notes that, in addition to compression of data, Kim is concerned with fitting and encoding contours, as evidenced by figures 2a-2c and col. 3, lines 10-30 of the reference. As stated in previous Office Actions, Kim does not disclose extraction of contour information. Suzuki, however, discloses that extraction of contour information is advantageous for easy manipulation and editing of images in col. 1, lines 10-24. This text including the extraction feature and proper motivation for combination with Kim was cited in the rejection to claim 12 on page 7 of the non-final Office Action mailed December 27, 2004. As claim 35 is dependent on claim 12, and proper motivation was already cited in

the rejection to claim 12, no further motivation rationale is necessary for the rejection to claim 35.

I. As to the argument that the rejection of claims 20-24 and 31-32 over Catros and Makram-Ebeid is improper because there is no motivation to combine the references:

Appellant argues that the solutions provided by Makram-Ebeid are not concerned with the problems of Catros. Appellant further argues that the examiner's argument that regions and contours are closely related is not supported by evidence. Appellant concludes that Catros and Makram-Ebeid are not compatible inventions and insufficient motivation exists to add the region merging teachings of Makram-Ebeid to the contour-fitting teachings of Catros. The examiner notes that the concept of contours defining regions is well-known in the art. The appellant's claim 20 includes a recitation of "regions defined by...respective contours". Answers.com recites the definition of a contour as "the outline of a figure, body, or mass". Region is defined as "a large, usually continuous segment of a surface or space; area". It is elementary that the outline of a figure would define a continuous segment of space. The concepts of regions and contours are so dependent on each other that it would be impossible to define a region without some sort of contour that surrounds it. Otherwise, the region would be indefinite.

Continuing to the references themselves, the examiner notes that figures 5a and 5b of Makram-Ebeid feature an image segmented into regions (or cells, as referred to by the disclosure). These regions are surrounded by outlines, which are, as described

above, synonymous with contours. Further, Makram-Ebeid discloses a function that takes into account total length of *boundaries*, another synonym for contours, in col. 1, lines 48-53. Clearly, Makram-Ebeid is concerned with contours. In fact, they are a major portion of the reference's disclosed Energy function. The Catros reference discloses *zones*, a synonym for regions, in col. 1, lines 11-29. The image disclosed by Catros is made up of zones and contour lines. It is further noted that class 382, subclass 130 was searched in the USPTO database for both references, thus signifying that the Office considered references similar to the Catros reference when deciding on Makram-Ebeid's patentability.

Makram-Ebeid discloses motivation for using a region merging method with a scale parameter in col. 1, lines 37-45, stating that it "eliminates the largest possible number of interfaces to merge adjacent regions whose intensities are practically identical". Applying the teachings of Makram-Ebeid to Catros would eliminate a number of contours (interfaces, boundaries, etc.), making Catros's goal of bridging contours easier, as the number of contours to bridge would be reduced.

J. As to the argument that the rejection of claims 20-24 and 31-32 over Catros and Makram-Ebeid is improper because positively recited limitations of the claims are not disclosed by the prior art even if the references are combined:

Appellant argues that neither Makram-Ebeid nor Catros discloses weighting the respective shortest path by gradient calculations or association of contours with a respective scale parameter. Appellant further argues that neither reference discloses determining a scale parameter that minimizes variances between regions defined by its

respective contours. On the contrary, Catros does disclose a method of weighting a respective shortest path by gradient calculations. As explained in pages 9-10 of the non-final Office Action mailed December 27, 2004, Catros discloses using gradient "amplitudes" in col. 2, lines 42-58. In image processing, a gradient measures change of color in an image on a given scale. Gradients are often used for contour detection because areas of an image where the largest amount of change takes place are likely to be contours that divide regions. The amplitude of a gradient is a representation of how much an image has changed from one area to another. In col. 2, lines 42-58 of Catros, the gradient amplitudes are used in an application of the Moore-Dijkstra algorithm to determine the best path to connect a disjointed contour. Because these amplitudes are numerical values associated with a gradient that are used to find a shortest path, they read on weight values. "Weight values" is considered a broad term because it is not further defined in claim 20, and thus, any numerical value that "weights" a path one way or another can read on a weight value.

With respect to contours associated with scale parameters, col. 1, lines 53-59 of Makram-Ebeid discloses that interfaces (i.e. boundaries or contours, see col. 1, line 30 of Makram-Ebeid) are eliminated when a scale parameter increases. Thus, each eliminated interface has an associated scale parameter or a plurality of associated scale parameters at which it exists. With respect to minimizing variance between regions, col. 1, lines 48-53 of Makram-Ebeid discloses an Energy function that "takes into account the intensity variance in each region". When two regions are merged, this signifies that the Energy function is minimized, and since intensity variance is a key portion of

Energy, it is also most likely at a minimum. Since claim 20 broadly recites "variance", it is assumed that "intensity variance" reads on such language.

K. As to the argument that the rejection of claim 24 over Catros, Makram-Ebeid, and Luo is improper because there is no motivation to combine the reference teachings:

Appellant argues that the modification of Catros to include a width parameter selected by user interface is contrary to the teachings of Catros. The examiner notes that col. 2, lines 63-68 and col. 3, lines 1-2 of Catros teach a width parameter of length D, as described in the rejection to claim 23 on pages 19-20 of the non-final Office Action mailed December 27, 2004. The examiner further notes that this disclosure describes a search space defined automatically using the coordinates of points A and B.

In p. 8, lines 1-8, Luo also discloses a width parameter, in the form of a "search stripe", which allows a user to limit the height and width of an area where contours can be located. In p. 1, lines 27-29, Luo discloses that fully automatic segmentation of images is difficult, giving the motivation to add a user interface to the invention of Catros. To make a task less difficult is a common motivation for combinations under 35 USC 103(a), and it is explicitly disclosed that the user interface in the Luo invention achieves this.

The examiner further notes that prior case law has stated making a process automatic vs. making a process manual is not a patentable distinction. See *In re Venner, 120 USPQ 192 (CCPA 1958).* Even assuming that the appellant is correct in

arguing that Catros and Luo cannot be combined, Catros alone would be sufficient to anticipate appellant's invention, because Luo only adds a manual interface.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Aaron Richer
October 26, 2005

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